

## CLAIMS

### WHAT IS CLAIMED IS:

1. A substrate having a coating thereon, the coating comprising:  
an ormosil composite including a plurality of inorganic particles of a size of at least one (1) micron entrapped therein.
2. The substrate of claim 1 wherein substantially all of said plurality of inorganic particles each being not greater than 75 microns in its maximum dimension.
3. The substrate of claim 1 wherein substantially all of said plurality of inorganic particles each being not greater than 5 microns in its maximum dimension.
4. The substrate of claim 1 wherein the concentration of said plurality of inorganic particles is between 1% and 90% of the total weight of said ormosil composite.
5. The substrate of claim 4 wherein the concentration of said plurality of inorganic particles is between 5% and 30% of the total weight of said ormosil composite.

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6. The substrate of claim 1 wherein said ormosil composite coating is of a thickness of between approximately 10 and 26 microns.

7. The substrate of claim 1 wherein said plurality of inorganic particles are selected from a group consisting of oxides, nitrides, carbides, and carbonitrides.

8. The substrate of claim 1 wherein said ormosil composite is formed through the hydrolysis and condensation of organically modified silane with an alkoxide precursor.

9. The substrate of claim 8 wherein said alkoxide precursor is a non-transition metal alkoxide.

10. A process for improving the abrasion and corrosion resistance of a metal prone to abrasion and corrosion, comprising:

applying to the metal a coating of an ormosil composite;

entrapping a plurality of inorganic particles of a size of at least one micron in maximum dimension in said ormosil composite.

11. The process of claim 10 further including applying said ormosil composite coating in a sol-gel process.